Functional Landscape Connectivity Of Greater Sage Grouse Habitat In A Multiple Use Landscape

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Maintaining connectivity of sage-grouse habitat is critical to managing sage-grouse populations in the presence of widespread human disturbance. We used an empirical approach to model connectivity of a landscape based on resource selection of free-ranging GPS-collared greater sage-grouse (*Centrocercus urophasianus*) in a natural gas field in central Wyoming. We analyzed resource selection during three movement states (encamped, traveling, and relocating) and incorporated turning angle to identify features that functioned as barriers or conduits to movement. To illustrate application of the results we used the resource selection model to create spatially-explicit predictive maps identifying areas that generally provided large amounts of high quality 'movement habitat.' We found that both males and females selected for vegetation variables at multiple spatial scales. When traveling or relocating, males and females tended to avoid natural gas and oil wells and associated infrastructure and avoided areas with high topographic roughness within 800m. High topographic roughness

was a barrier for traveling males. Relocating females were more likely to travel in a straight direction through areas of high road density and steep slopes. The predictive maps validated well using independent GPS location data. These results provide insight into habitat preferences of sage-grouse and can be used for both general and site-specific guidance on identifying habitats preferred or avoided during moderate and long distance movements of sage-grouse. When combined with critical seasonal use maps, e.g., nesting/brooding habitat and winter range, land managers could delineate areas of high value for connectivity of critical seasonal use areas.